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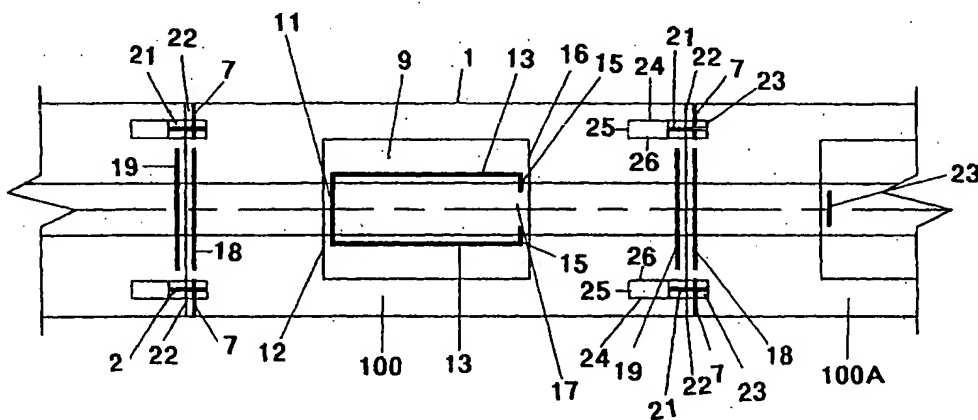
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: PLASTICS PACKAGING



(57) Abstract: A plurality of discrete packages (100) are manufactured from an indefinite length of gusseted packaging material (1). Each package (100) has an insert (9) inserted through an incision (7) in the packaging (1) which in use maintains a desired footprint of the package. Gaps (17) in welds (15) joining the bottom of the insert (9) to the packaging material (1) allow air to vent from between the insert (9) and the packaging material (1). Flaps (23) toward the rear of each package (100) join a leading package (100) to a following package (100a) by means of longitudinal welds (21) which allow gaps (22) for air to vent during the roll-up process.

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## PLASTICS PACKAGING

**BACKGROUND OF THE INVENTION**

In the packaging of bulk materials, various proposals have been put forward and are currently in use. All of these are directed towards  
5 facilitating the packaging, storage, transport and/or subsequent discharge of large quantities of materials such as milk powder.

One bulk material package which enables the substantially rectangular shape of the package to be maintained when it is full of the  
10 material is that which is marketed under the **GAMBO** (trade mark). This is described and claimed in New Zealand Patent No. 233890 for example.

The present invention has particular application in its use with a **GAMBO (TM)** bag, but those skilled in the engineering and packaging arts  
15 will appreciate that the present invention can find application in improving the manufacture and design of other types of packaging and is not limited to large plastic bags of the **GAMBO (TM)** type specifically.

In large flexible bags such as the **GAMBO (TM)** bag, an insert within  
20 the outer film provides for the maintenance of the rectangular shape of the flexible bag when it is filled. However, the provision of such inserts within the outer film has proved difficult or at least time consuming and expensive.

25 Previous methods of welding these inserts have also allowed air to be entrapped between the insert and outer pack. This has made winding up of a continuous roll impractical.

**OBJECT OF THE INVENTION**

The present invention, therefore, has as one object to provide a flexible bag having an insert/or a method of manufacturing same, which will overcome or at least alleviate problems in such bags and/or their manufacture, to the present time, or which at least will provide the public with a useful choice.

Further objects will become apparent from the following description.

**SUMMARY OF THE INVENTION**

According to one aspect of the present invention, there is thus provided flexible packaging of indefinite length providing a plurality of interconnected but separable flexible packages each having a respective insert positioned and secured within an outer flexible film, a transverse slit across a top layer of the outer flexible film defining the commencement of one of the bags providing at least part of the access into the interior of the outer film for the insertion of the insert.

Preferably said indefinite length of flexible packaging material may be gusseted to produce four plies of film, the packaging having substantially transverse incisions through at least three of the said plies leaving one of said plies intact to define the boundaries of a separable individual package having a leading edge and a trailing edge, an insert being provided for each individual package via the incisions and welded to the outer layer by welds running substantially parallel to the sides of the package, an area between the welds being left unsealed to allow air to

escape from between the insert and the outer layer as the material, in use, is wound up.

Preferably, the packaging may have a further weld extending  
5 substantially parallel and adjacent to the leading edge of the outer layer, one or more further welds extending substantially parallel and adjacent to the trailing edge of the outer layer, and a plurality of further longitudinal welds joining the top gusset trailing edge of each package to the top gusset leading edge of the adjoining package.

10 Preferably the trailing edge of a leading package is connected to the leading edge of a following package by means of a flap created in one or more of the plies of said leading package proximate the trailing edge of said leading package and positioned or folded to extend between said trailing  
15 edge of said leading package and said leading edge of said following package.

According to a further aspect of the present invention, a flexible  
20 package is provided as a bag separated from the above defined continuous packaging.

According to a further aspect of the present invention, there is  
provided a method of forming continuous flexible packaging to provide a  
plurality of interconnected but separable flexible packages, said method  
25 including the transporting of an indefinite length of flexible outer film past a cutting means; moving the cutting means relative to the outer film in cutting only a top portion of the outer film and leaving a bottom portion intact, said method further including the insertion of an insert into the packaging at each slit so formed, providing sealing means to seal across at  
30 least part of the slit and in front of the slit to define a closure for an end of

a preceding package and further providing securing means to secure said insert in position within the outer film.

According to a further aspect of the present invention, a method as  
5 above defined includes a continuous gusseted outer film, the cutting means cutting through three of four plies formed by the gusseting of the continuous film, the method further including the opening out of the film to enable the insertion of the insert and further providing for the re-gusseting of the outer film.

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According to a further aspect of the present invention there is provided a method of forming a plurality of flexible packages, the method including:

15

- providing an indefinite length of gusseted flexible packaging forming four plies.

20

- forming transverse welds between the outer edges of the top ply and the outer edges of the second ply and transverse welds between the outer edges of the third ply and the outer edges of the lower ply, said welds extending partially but not entirely across the width of said gussets;

25

- creating an incision adjacent and in front of the transverse welds through at least the top three of the four plies, leaving one ply intact, to define a trailing edge of an individual package in front and a leading edge of an individual package behind;

30

- introducing an insert into the flexible packaging through the incision;

5       • welding the insert to the flexible packaging in a plurality of locations such that in use the bag when filled with product deforms into a required shape, the welds running substantially parallel to the sides of the packages;

10       • welding the insert to the flexible packaging at substantially the leading edge of the insert, the weld extending substantially between and transverse to the first welds;

15       • welding the insert to the flexible packaging at substantially the trailing edge of the insert, the weld extending partially between and transverse to the first welds such that an area between the first welds is left open to allow air to escape from between the insert and the outer layer.

Preferably the welds of the paragraph immediately above may be formed separately.

20       According to a still further aspect of the present invention, a continuous flexible packaging and/or a flexible package provided as one of a plurality of such packages as part of a continuous flexible packaging of indefinite length and/or a method of manufacturing same are substantially as herein described.

25       Further aspects of the this invention, which should be considered in all its novel aspects, will become apparent from the following description given by way of example and possible embodiments thereof, and in which reference is made to the accompanying drawings.

30

**BRIEF DESCRIPTION OF THE DRAWINGS**

- 5                   **FIGURES 1(a) & 1( b):**       Show very diagrammatically a side and plan view respectively of a production line for producing gusseted bulk material packages according to one embodiment of the invention;
- 10                   **FIGURE 2:**                   shows diagrammatically an outer packaging layer with an insert installed and welded;
- 15                   **FIGURE 3:**                   shows one of a plurality of bulk material packages with an insert installed and welded, including optional welds for sealing feedspouts;
- 20                   **FIGURE 4:**                   shows a cross section of an in-use bulk material package of the **GAMBO™** type; and
- 25                   **FIGURES 5(a) & 5(b):**       shows two possible embodiments of a bulk material package, one with a sealed feedspout and one with a feedspout not sealed.

**DESCRIPTION OF POSSIBLE EMBODIMENTS OF THE INVENTION**

Referring first to Figures 1(a), 1(b), and 2, in the manufacture of a continuous length of gusseted bulk material packages each generally  
30                   referenced by arrow 100, a length of gusseted packaging material 1 having four plies 2, 3, 4, 5 unrolls from a bulk spool of packaging material 6. A partial transverse weld 7 is then formed by suitable welding means across gussets 2 and 3 and gussets 4 and 5.

35                   Cutting means create an incision 8 adjacent and in front of the transverse weld 7 through three of the four plies 2, 3, 4 in the packaging material 1, defining a trailing edge of an individual package 100 and the

leading edge of the next package 100a. Lifting means 101 lift the top three plies 2, 3, 4 of the packaging material 1 and an insert 9 is inserted by suitable means to a required position within the packaging material. The lifting means 101 may include a pneumatically, vacuum or mechanically  
5 operated device or lever to lift the plies 2, 3, 4.

Preferably the insert 9 is severed from a continuous roll of suitable insert material 10.

10 Referring next to Figure 3 and 4, welding means of any suitable type (not shown) create welds 11 between the insert 9 and the packaging material 1 substantially parallel and adjacent to the leading edge 12 of the insert 9. Welds 13 are also created between the insert 9 and the  
15 packaging material 1 substantially parallel to the sides of the packaging material 1, in a suitable position to provide the package 100 with a desired shape 14 when in use, illustrated by way of example in Figure 4, although it is to be appreciated that the present invention is not limited to GAMBO™ type inserts.

20 Further welds 15 are created substantially parallel and adjacent to the trailing edge 16 of the insert, with an area 17 left unwelded to allow air entrapped between the insert 9 and the packaging material 1 to escape.

The applications of seals 11, 13 and 15 may be performed  
25 simultaneously or sequentially.

Referring particularly to Figure 3, welding means (not shown) create short longitudinal welds 21 across the outer edges of the incision in the plies forming a weld between the adjoining material while creating an  
30 intermediate area 22 for air to vent from the package as it is wound up.



The welds 21 may be formed between the top ply 2 of the package 100 and a separate piece of flexible packaging material, or more preferably, a substantially rectangular flap 23 may be defined by creating three  
5 incisions 24, 25, 26 in the top ply 2 in the area proximate the trailing edge of the package 1. The flap 23 may be defined in the area outside that later defined by the feedspout and may be of such position and size as to allow the flap 23 to be folded under the trailing edge of the package 100 and the leading edge of the following package 100a. Short longitudinal welds 21  
10 are formed between the flap 23 and the top ply 2 of the package 100, and between the flap 23 and the top ply 2 of the following package 100a, thus joining the top plies of the two adjacent packages 100, 100a. In this way the top plies of the packages 100, 100a may be held together during subsequent operations.

15

Alternatively a plurality of flaps 23 may be formed by extending incisions 24, 25, 26 through one or more of the lower plies 3, 4, 5.

The packaging is then rolled onto a third roll 27 via nip rollers 28,  
20 see Figure 1(b), which squeeze the gusseted layers forcing out entrapped air through the air venting areas 17, 22 described above.

Referring next to Figure 5(a), if a sealed feedspout design is required, welding means create one or more transverse welds 18  
25 substantially adjacent to the leading edge of the package, the welds extending across the middle of the package.

Alternatively, if an open feedspout design is required as in Figure 5(b), welds 7 applied prior to cutting of the plies 2, 3, 4 may be used to

define the outer edge of the feedspout. Further welds defining feed and exit spouts 20 are performed by the user.

5 If a sealed discharge spout is required, welding means create one or more transverse welds 19 substantially adjacent to the trailing edge of the package 100, the welds extending across the middle of the package to close the area defined by the exit of the spout.

10 Where in the foregoing description, reference has been made to specific components of integers of the invention having known equivalents then such equivalents are herein incorporated as is individually set forth.

15 Although this invention has been described by way of example and with reference to possible embodiments thereof, it is to be understood that modifications or improvements may be made thereto without departing from the scope or spirit of the invention defined in the appended claims.

**CLAIMS**

1. An indefinite length of flexible packaging providing a plurality of interconnected but separable flexible packages each having a  
5        respective insert positioned and secured within an outer flexible film, a transverse slit across a top layer of the outer flexible film defining the commencement of one of the packages providing at least part of the access into the interior of the outer film for the insertion of the insert.  
10
2. The packaging of claim 1 wherein the outer flexible film is gusseted to produce four plies of film, the packaging including substantially transverse incisions through three of the said plies leaving one of  
15        said plies intact to define the boundaries of a separable individual package having a leading edge and a trailing edge, said insert being provided for each individual package via the incisions and welded to the outer layer by welds running substantially parallel to the sides of the package, an area between the welds being left unsealed to allow air to escape from between the insert and the outer layer as the  
20        material, in use, is wound up.
3. The packaging of claim 2 wherein the packaging includes a further weld extending substantially parallel and adjacent to the leading  
25        edge of the outer layer, one or more further welds extending substantially parallel and adjacent to the trailing edge of the outer layer, and a plurality of further longitudinal welds joining the top gusset trailing edge of each package to the top gusset leading edge of the adjoining package.
4. The packaging of claims 1, 2 or 3 wherein the trailing edge of a  
30        leading package is connected to the leading edge of a following

package by means of a flap or flaps created in one or more of the plies of said leading package proximate the trailing edge of said leading package and positioned or folded to extend between said trailing edge of said leading package and said leading edge of said following package, the flap or flaps welded to the plies of said packages by longitudinal welds.

5 5. The indefinite length of packaging substantially as herein described with reference to the accompanying drawings.

10 6. An individual package separated from the indefinite length of flexible packaging of any of claims 1-5.

15 7. A method of forming an indefinite length of continuous flexible packaging to provide a plurality of interconnected but separable flexible packages, said method including the transporting of an indefinite length of flexible outer film past a cutting means, moving the cutting means relative to the outer film in cutting only a top portion of the outer film and leaving a bottom portion intact, said method further including the insertion of an insert into the packaging at each slit so formed, providing sealing means to seal across at least part of the slit and in front of the slit to define a closure for an end of a preceding package and further providing securing means to secure said insert in position within the outer film.

25 8. The method of claim 7 wherein said flexible packaging includes a continuous gusseted outer film with four plies, the cutting means cutting through three of the four plies formed by the gussetting of the continuous film, the method further including the opening out of the film to enable the insertion of the insert and further providing for

30

the re-gusseting of the outer film.

9. The method of claim 8 including:

- 5       • Preceding the cutting of the top three plies by forming transverse  
      welds between the outer edges of the top ply and the outer  
      edges of the second ply and transverse welds between the outer  
      edges of the third ply and the outer edges of the lower ply, said  
10       welds extending partially but not entirely across the width of  
      said gusset;
- introducing an insert into the flexible packaging through the  
      incision;
- 15       • welding the insert to the flexible packaging in a plurality of  
      locations such that in use the bag when filled with product  
      deforms into a required shape, the welds running substantially  
      parallel to the sides of the packages;
- 20       • welding the insert to the flexible packaging at substantially the  
      leading edge of the insert, the weld extending substantially  
      between and transverse to the first welds;
- welding the insert to the flexible packaging at substantially the  
25       trailing edge of the insert, the weld extending partially between  
      and transverse to the first welds such that an area between the  
      first welds is left open to allow air to escape from between the  
      insert and the outer layer.

10. The method of any of claims 7, 8 or 9 wherein a trailing edge of the preceding package is connected to a leading edge of a following package by means of a flap or flaps created proximate the trailing edge of said preceding package and positioned to extend between said leading edge and said trailing edge, the flap or flaps welded to said packages by means of longitudinal welds formed between said flap or flaps and said packages.
11. A continuous flexible package and/or a flexible package provided as one of a plurality of such packages or as part of a continuous flexible packaging of indefinite length and/or a method of manufacturing same substantially as herein described.

1/4

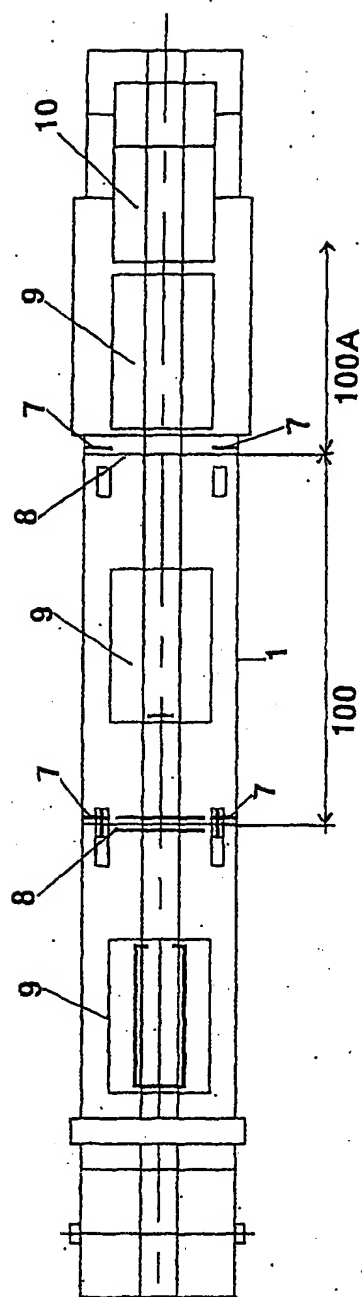


FIG. 1(a)

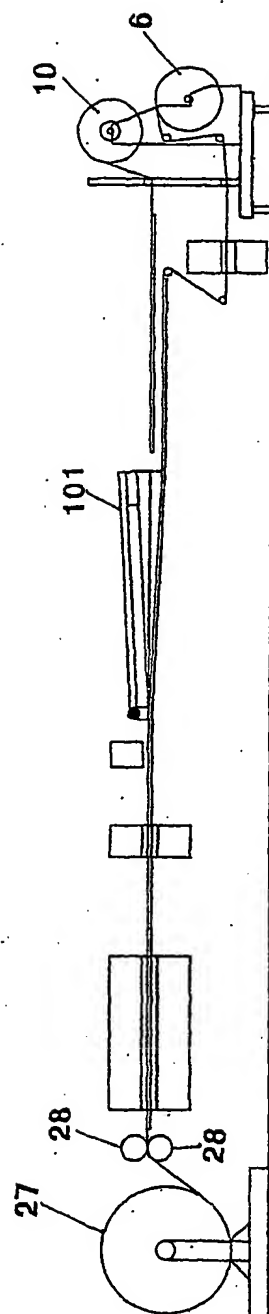


FIG. 1(b)

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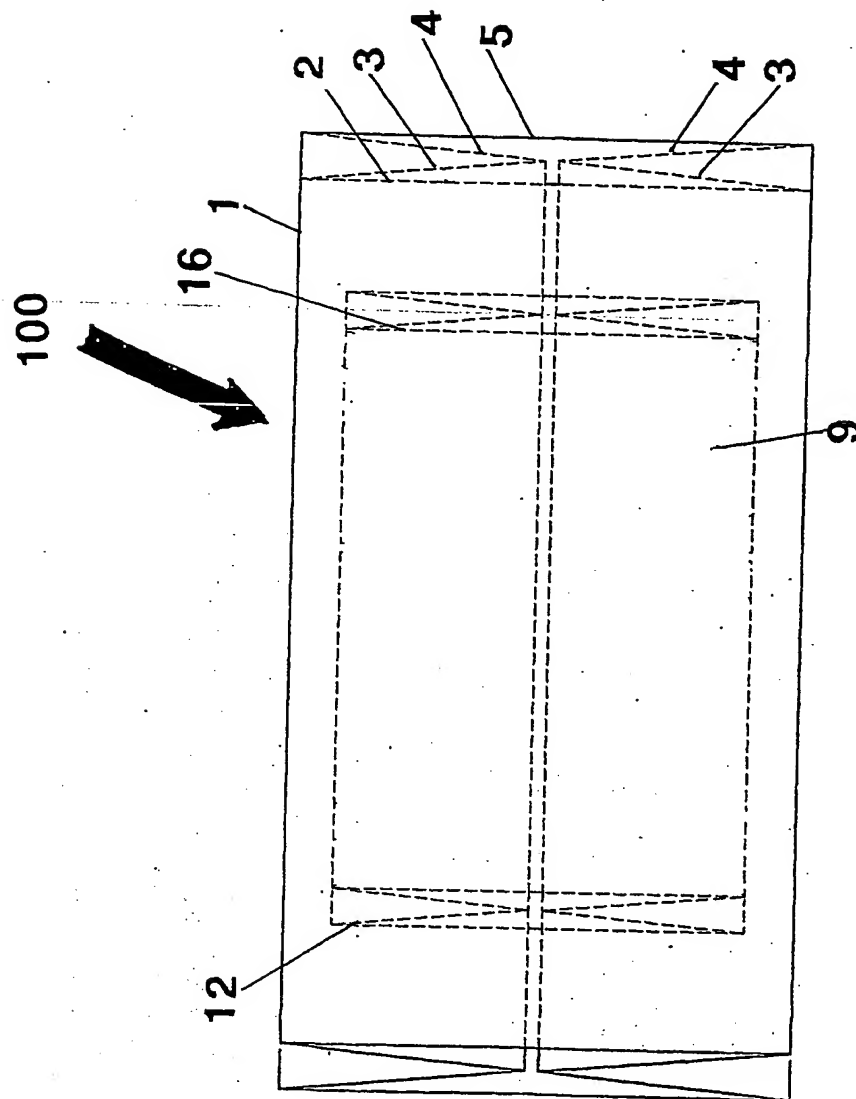


FIG. 2



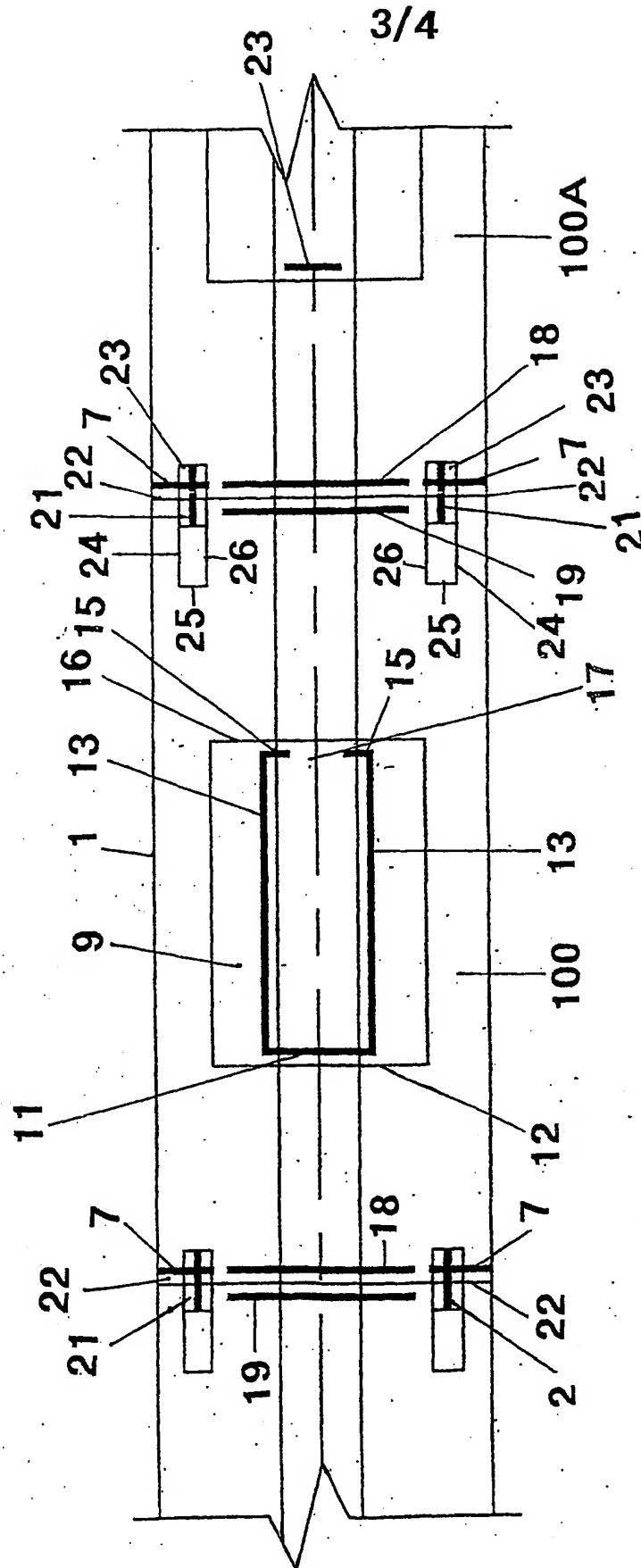


FIG. 3

4/4

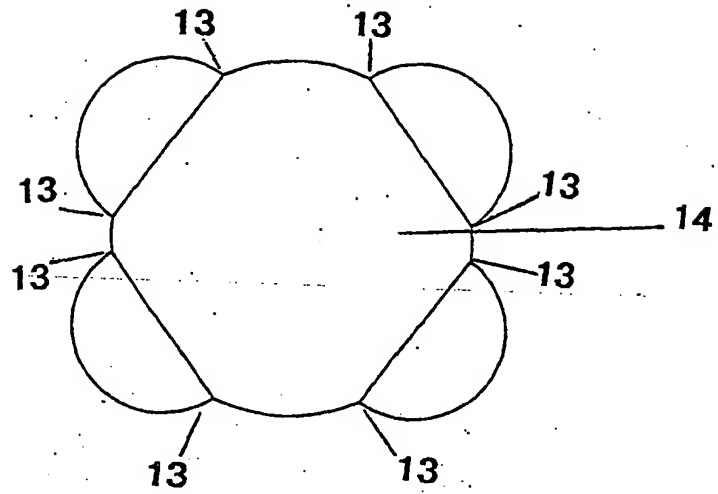


FIG. 4

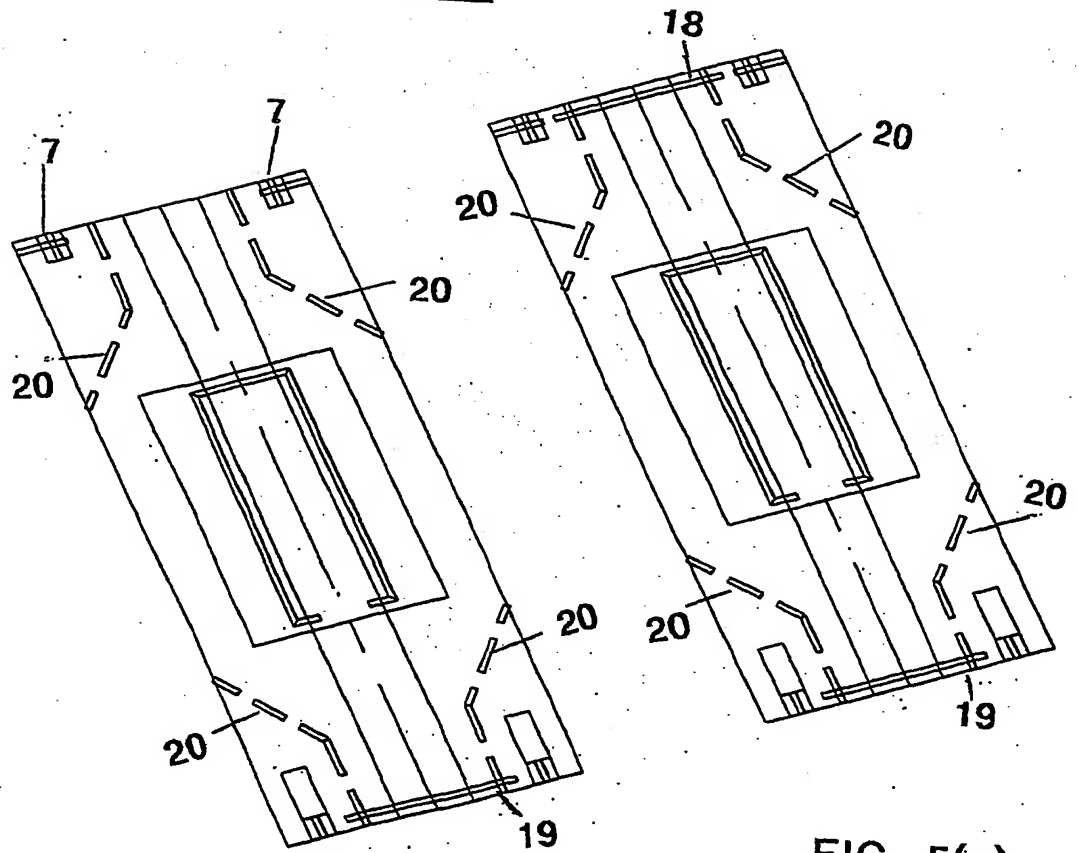


FIG. 5(a)

FIG. 5(b)

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/NZ01/00103

<b>A. CLASSIFICATION OF SUBJECT MATTER</b>		
Int. Cl. <sup>7</sup> : B65B 9/04, 43/06, B65D 30/14, 75/42, 77/04,		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b>		
Minimum documentation searched (classification system followed by classification symbols)		
Refer electronic database consulted below		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
DWPI B65B 5/-, 7/-, 9/-, 43/-, B65D 30/-, 33/, 77/04, 77/22, 77/24, 77/00, 81/00, 75/42, 75/40 with keywords flexib, stretch, bend, pliable, elastic, packag, bag, sack, web, blank, film, slit, cut, incision, separable, detach, independ, multipl, plural, interconnect, combin, join, attach, weld, seam & others		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3958749 A (GOODRICH) 25 May 1976 see abstract	1-11
A	US 4273549 A (PEZZANA ET AL) 16 June 1981 see abstract	1-11
A	WO 9107319 A (THERMARITE PTY LIMITED) 30 May 1991 see abstract	1-11
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C <input checked="" type="checkbox"/> See patent family annex		
<p>* Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&amp;" document member of the same patent family</p>		
Date of the actual completion of the international search 22 August 2001		Date of mailing of the international search report 4 SEPTEMBER 2001
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustalia.gov.au Facsimile No. (02) 6285 3929		Authorized officer  M.S. HAYNES Telephone No : (02) 6283 2170

## INTERNATIONAL SEARCH REPORT

International application No.

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 9520485 A (TAN) 3 August 1995 see abstract	1-11
A	DE 2919567 A (ANIDRITI ET AL) 29 November 1979 see abstract	1-11

INTERNATIONAL SEARCH REPORT  
Information on patent family members

International application No.  
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This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member			
US	3958749	CA	978906	DE	2254640
		GB	1411759	JP	49014270
		US	3807626	US	3910488
US	4273549	AT	4410/79	AT	2316/82
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